CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: October 8, 2001 PUB-RR-676

TO: DNR Bureau for Remediation and Redevelopment Staff, Statewide

FROM: Mark F. Giesfeldt – RR/3

SUBJECT: Application of Soil Performance Standards Guidance

This memo summarizes existing rules and guidance pertaining to the following question:

What is the level of soil contamination that is required to be addressed, and hence, could be addressed through the use of a soil performance standard at closure?

Information in this memo is intended to supplement the RR program's "Interim Guidance on Soil Performance Standards", Publication RR-528. Information is provided for the two pathways that are most commonly required to be addressed at sites, direct contact and groundwater.

A. **Direct Contact Pathway.** Remedies that address the direct contact pathway without treating or removing the soil, such as covering the contaminated soils in-place, are considered a soil performance standard remedy and must meet the requirements of chs. NR 720.19(2). Contaminant concentrations that must be addressed under the direct contact pathway are found in Table 2 of ch. NR 720 or can be determined according to the procedures of NR 720.11. Residual contaminant levels from petroleum product discharged from a petroleum storage tank are exempt from NR 720.19 (that is, neither soil performance standards nor site specific RCLs are applied, as provided in NR 720.11(5)(a)1.), if the contaminant levels are less than Table 1 in ch. NR 746, for ethylbenzene, toluene, xylene, 1,2,4- and 1,3,5- trimethylbenzene, and naphthalene and less than Table 2 of NR 746 for benzene and 1,2-dichloroethane. Contaminants not listed in NR 746, Tables 1 and 2, or that exceed NR 746, Tables 1 and 2 values, are subject to compliance with NR 720.

   To determine the direct contact levels that require remediation of non-petroleum compounds not listed in Table 2 of NR 720, or compounds that exceed NR 746 Tables 1 and 2 values, the default exposure assumptions listed in s. NR 720.19(5)(c) can be "plugged" into the U.S. EPA SSL website at http://risk.lsd.ornl.gov/epa/ssl1.htm. If two or more contaminants are present, the resulting direct contact levels for each contaminant must be adjusted downward to maintain the cumulative risk below NR 720.11(3) requirements.

B. **Groundwater Pathway**. Remedies addressing a groundwater pathway must reduce leaching of contaminants from the soil to groundwater such that a preventive action limit (PAL) is not exceeded in groundwater that did not have previous PAL exceedances, in compliance with NR 720.19 (4)(a) and NR 140. A site can be quickly screened to determine whether leaching of soil contaminants is likely to exceed a PAL in groundwater by using the EPA web site listed above and selecting the "soil-to-groundwater" pathway. A soil performance standard may be used when it is not practicable to achieve these residual contaminant levels.

   1. **Groundwater contamination less than preventive action limits**. Where soil contamination exists with low or no groundwater contamination, soil clean up or use of a soil performance standard may be necessary if it is likely that future leaching of soil contaminants will exceed a PAL in groundwater. In addition, contaminants that currently have no groundwater standard

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(e.g., TBA) but may pose a threat to groundwater must also be addressed.

a. **Petroleum contaminants from petroleum storage tank systems**. These sites are exempt from NR 720.19 if the residual soil contaminant levels do not exceed the levels in Table 1 of NR 746 for ethylbenzene, toluene, xylene, 1,2,4- and 1,3,5- trimethylbenzene, and naphthalene, or the levels in Table 2 of NR 746 for benzene and 1,2-dichloroethane, and the site satisfies all of the risk screening criteria in NR 746.06 (2) and is eligible for closure under NR 746.07 or NR 746.08. Under these circumstances a soil performance standard is not necessary.

b. **All other contaminants, and petroleum contaminants at sites that do not satisfy all of the criteria in paragraph a.** If there is no threat to groundwater from soil contamination, a soil remedy for the groundwater pathway is not needed. However, the lack of groundwater contamination, by itself, is not sufficient to establish that there is no threat to the groundwater pathway. If groundwater contamination does not exist or exists below ch. NR 140, Wis. Adm. Code, preventive action limits, the following approaches can be used to screen sites to determine if a threat exists to the groundwater pathway:
   - The likelihood that contaminants will reach the groundwater in the future can be evaluated by considering the age of contaminant release, type of contaminants, soil type, depth to groundwater, permeability of the surface cover, etc.
   - Generic groundwater pathway numbers may be calculated according to NR 720.09 or site-specific groundwater pathway numbers may be calculated according to NR 720.19. The U.S. EPA SSL web site listed above can be used to calculate groundwater pathway numbers. Conservative soil parameters (such as an organic carbon fraction of 0.1% or less, and a dilution factor of 1) should be used if the information is lacking from the site investigation, or if the site is larger than 0.5 acre. If the U.S. EPA web site is used to calculate screening numbers, correct for a PAL-based groundwater concentration (because the web site uses federal drinking water standards).
   - Table 1 of NR 720 may also be used to determine if soil contaminant concentrations should be addressed under the groundwater pathway.

   If it is determined that there is a threat to the groundwater pathway, an appropriate remedy for the soil should be developed. A soil performance standard can be selected as a remedial option. For example, a performance standard to address the soil-to-groundwater pathway might include maintenance of an impermeable cap to limit infiltration.

2. **Groundwater contamination equal to or greater than preventive action limits**. In most, but not all cases, groundwater contamination is accompanied by soil contamination. Consultants should use site investigation results to assess whether the existing contamination in the soil is continuing to be released to the groundwater. If soil provides an on-going source of contaminants to groundwater, then the site remedy should address the soil contamination. Because natural attenuation of contaminants in groundwater can often control contaminants leaching from the soil, natural attenuation can be selected as a soil performance standard. To qualify as a soil performance standard, natural attenuation must be shown to be effective. That is, the groundwater contaminant plume must be stable or receding and groundwater standards will be met within a reasonable period of time.

   The consultant should determine whether soil is continuing to release contaminants into the groundwater using the latest soil sampling data that is available. If it is unknown whether contaminants continue to be released from the soil to the groundwater, the following approaches can be used to screen sites:

- As in B.1.b. above, groundwater pathway numbers can be calculated according to NR 720.09 or NR 720.19. The U.S. EPA SSL web site listed above can be used to calculate groundwater pathway numbers. Conservative soil parameters (such as an organic carbon fraction of 0.1% or less, and a dilution factor of 1) should be used if the information is lacking from the site investigation, or if the site is larger than 0.5 acre. If the U.S. EPA web site is used to calculate screening numbers, correct for a PAL-based groundwater concentration (because the web site uses federal drinking water standards).
- Non-petroleum contaminants & petroleum NOT eligible for closure under NR 746, use NR 720 Table 1 values to screen sites.
- Other appropriate methods to assess contaminant release to groundwater.

a. **Petroleum contaminants from petroleum storage tank systems**. These sites are exempt from NR 720.19 if soil contaminant concentrations do not exceed the levels in Table 1 of ch. NR 746 for ethylbenzene, toluene, xylene, 1,2,4- and 1,3,5- trimethylbenzene, and naphthalene, or the levels in Table 2 of ch. NR 746 for benzene and 1,2-dichloroethane, and the site satisfies all of the risk screening criteria in NR 746.06 (2) and is eligible for closure under NR 746.07 or NR 746.08. Under these circumstances a soil performance standard is not necessary.

b. **All other contaminants, and petroleum contaminants at sites that do not satisfy all of the criteria in paragraph a**. Soil concentrations above the screening levels should be addressed in the site remedy. However, clean up to generic RCLs or SSRCLs is not required. Under NR 720.19(3), if the SSRCLs that are protective of public health, safety and welfare and the environment are not practicable to achieve, the responsible party may choose a soil performance standard to address the remaining soil contamination. The selected soil performance standard must be protective of public health, safety and welfare and the environment.

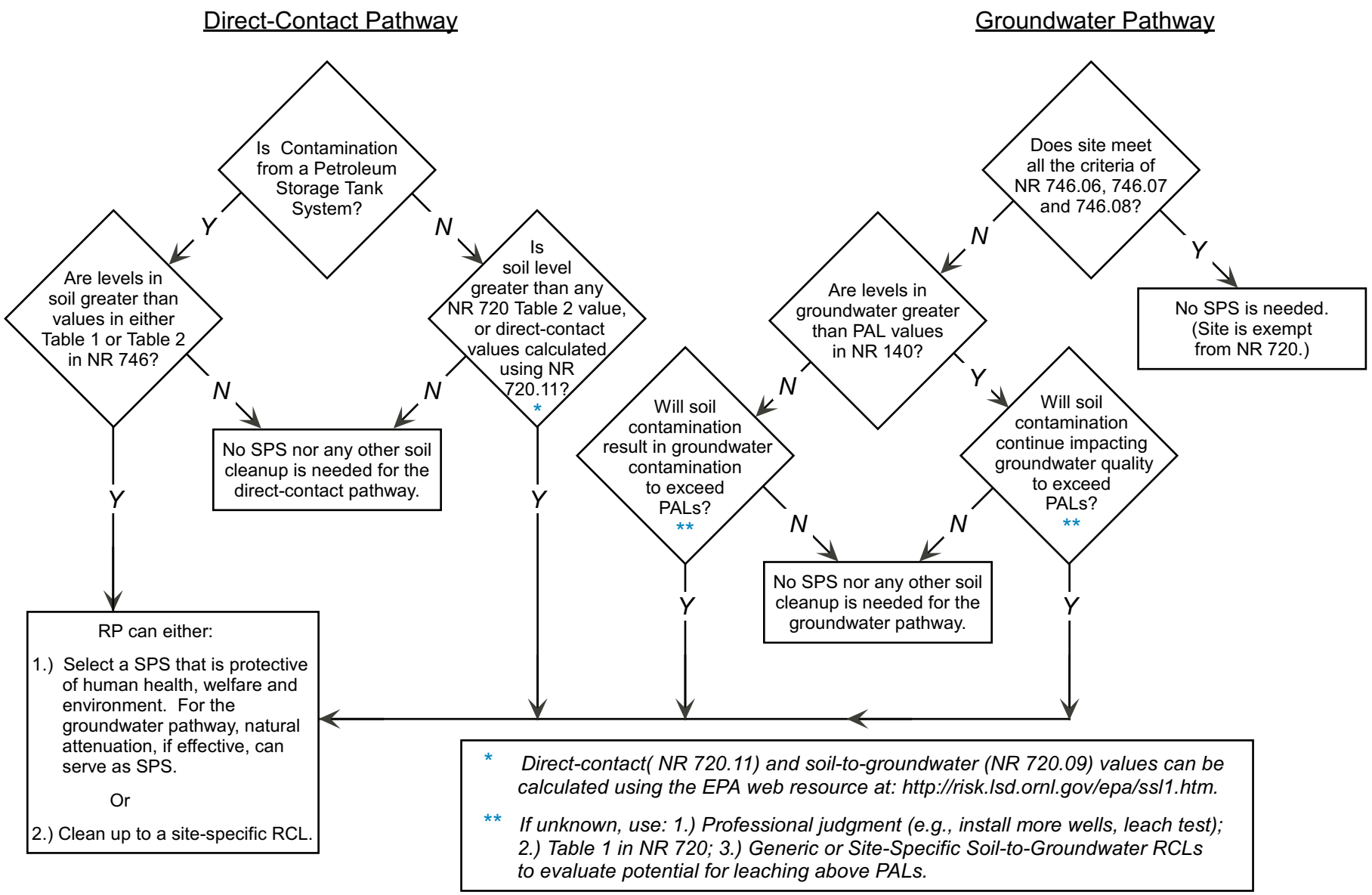
Existing conditions that create a "soil performance standard"

At many sites, a relatively impermeable seal, such as a parking lot or building, covers contaminated soil. The site investigation may indicate that the soils in their contained state do not present a threat for direct contact or leaching to groundwater. However, the contaminated soil may present a threat to one or both of these pathways if the surface seal were removed. In these instances, the existing surface seal acts as a soil performance standard and, like all soil performance standards, must be maintained after site closure. Maintenance agreements and deed restrictions for soil performance standards are addressed in the RR program's Interim Guidance on Soil Performance Standards, Publication RR-528.

Questions on this memo should be directed to Terry Evanson.

Note: This document is intended solely as guidance and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. This guidance does not establish or affect legal rights or obligations and is not finally determinative of any of the issues addressed. This guidance does not create any rights enforceable by any party in litigation with the State of Wisconsin or the Department of Natural Resources. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts.

Decision Path for the Application of Soil Performance Standards (SPS)



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